MEMOIR 1: MIAMI GEOLOGICAL SOCIETY

A SYMPOSIUM OF RECENT SOUTH FLORIDA FORAMINIFERA

by

W. D. Bock
W. W. Hay
J. I. Jones
G. W. Lynts
S. L. Smith
R. C. Wright

Edited by James I. Jones and Wayne D. Bock

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chamber.

This species has rare to common occurrences at only six stations.

FAMILY MILIOLIDAE Ehrenberg, 1839

SUBFAMILY QUINQUELOCULININAE Cushman, 1917

GENUS QUINQUELOCULINA d'Orbigny, 1826

Quinqueloculina agglutinans d'Orbigny, 1839 (Plate 4, Figs. 3-5)

Quinqueloculina agglutinans d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 195, Pl. 12, Figs. 11-13.

Diagnosis. Test large, longer than broad; chambers inflated; sutures indistinct; wall agglutinated, principally of coarse sand grains from associated sediment, imbedded in calcareous cement, whole surface having very rough appearance; last-formed chamber extended at apertural end into slight neck; aperture subcylindrical, with variable tooth structure.

Discussion. This species exhibits a wide range of variability in tooth structure and in the degree of roundness of the chambers. Specimens occur with single, undivided teeth, with or without thickening at the tip; with single, bifid teeth; and with two subequal teeth extending in toward the center of the aperture from opposite sides. In specimens with two subequal teeth, the main tooth may or may not become bifid at the tip. Specimens may have rounded to subangular chambers.

Quinqueloculina agglutinans differs from Quinqueloculina sabulosa in being much larger and in exhibiting a wide range of variability in tooth structure, and from Quinqueloculina bidentata in having a more rounded periphery and a more pronounced neck, although overlap between the two species appears to exist.

This species is common in the area, occurring in frequencies from rare to abundant at 78 stations. Frequencies are highest at those stations within Florida Bay proper, with the coarsest sediment suggesting sorting by wave action, it is however, absent from stations which become quite brackish during the rainy season as well as from the deepest stations.

Quinqueloculina antillarum d'Orbigny, 1839

Quinqueloculina antillarum d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 194, Pl. 12, Figs. 4-6.

Diagnosis. Test ovate to oblong, compressed, longer than broad, margins irregularly carinate; chambers triangular in cross section, compressed, arcuate; aperture oblong, with single, elongate, bifurcate tooth.

Discussion. This species is rare, occurring at only three stations, 4, 24 and 26, in very low frequencies.

Quinqueloculina bicarinata d'Orbigny, 1826 (Plate 4, Figs. 6-8)

Quinqueloculina bicarinata d'Orbigny, 1826, Ann. Sci. Nat., ser. 1, v. 7, p. 302.

Diagnosis. Test ovate, anterior truncate, posterior obtuse, triangular in transverse section; sutures distinct, depressed; chambers round, periphery with double carinae; wall smooth, polished; aperture small, oval, with simple tooth.

Discussion. This species is similar to some smaller specimens of Quinqueloculina lamarckiana, but differs from it in possessing double carinae and in having less angular chambers.

This species has common occurrences at only two stations, 95 and 96.

Quinqueloculina bicostata d'Orbigny, 1839 (Plate 4, Figs. 9-11)

Quinqueloculina bicostata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 195, Pl. 12, Figs. 8-10.

Diagnosis. Test nearly as broad as long, chambers broad, sutures usually rather indistinct, peripheral margin in earlier chambers sharply carinate, in adult specimens bicostate, wall otherwise smooth, concave adjacent to periphery, inflated near inner margin, in end-view decidedly angled, apertural end slightly, if at all, produced; aperture nearly circular, with smooth, slightly raised lip, tooth simple, not prominent.

Discussion. This species is common at ten stations, all located in the somewhat deeper waters of the Gulf of Mexico immediately adjacent to the western margin of Florida Bay. It is completely absent from all stations in the relatively shallower waters of the Bay itself.

Quinqueloculina bidentata d'Orbigny, 1839 (Plate 4; Fig. 12; Plate 5, Figs. 1-2)

Quinqueloculina bidentata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 197, Pl. 12, Figs. 18-20.

Diagnosis. Test large, longer than broad, periphery squarely truncate; chambers angular, almost square; sutures indistinct; wall agglutinated, principally of coarse, calcareous sand grains from associated sediment, imbedded in calcareous cement, whole surface has rough appearance; aperture circular, usually with thin, single tooth with broad bifid tip.

Discussion. Some specimens of this species show a slight development of a secondary tooth opposite the main tooth. It is similar to some specimens of Quinqueloculina agglutinans, but differs in having a more squarely truncate periphery, in possessing almost no neck and in exhibiting little variation in tooth structure. All ranges of variation appear to exist between the two species, from the squarely truncate forms on one end of the range to the completely rounded forms on the other.

Quinqueloculina bidentata occurs at 36 stations in low to medium frequencies. It, like Quinqueloculina agglutinans, appears to be limited to those stations in Florida Bay with the coarsest sediment, and it also is absent from the stations showing the greatest range in salinity and from the stations located in the deepest water in the area.

Quinqueloculina bosciana d'Orbigny, 1839 (Plate 5, Figs. 3-5)

Quinqueloculina bosciana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 191, Pl. 11, Figs. 22-24.

Diagnosis. Test small, very elongate; chambers rounded, inflated, last-formed chamber extending over preceding chamber on both sides; sutures distinct; wall calcareous, smooth, translucent; aperture open, at end of last-formed chamber, with simple tooth.

Discussion. This species is similar to Quinqueloculina laevigata, but differs from it in being non-costate and in having a simple, non-bifid tooth.

Quinqueloculina bosciana is the second most abundant species of the entire fauna, occurring at a total of 75 stations, usually in medium to high frequencies. It is almost entirely limited to the stations within Florida Bay proper, with the highest frequencies occurring at those stations with the finer sediment.

Quinqueloculina cf. Q. bradyana Cushman, 1917 (Plate 5, Figs. 6-8)

Miliolina undosa Brady (not Quinqueloculina undosa Karrer), 1884, Rep. Voy. Challenger, Zool., v. 9, p. 176, Pl. 6, Figs. 6-8.

Quinqueloculina bradyana Cushman, 1917, Bull. 71, U.S. Nat. Mus., pt. 6, p. 52, Pl. 18, Fig. 2.

Diagnosis. Test stout, usually slightly longer than broad; chambers angular, more or less

plicated laterally, outer peripheral angle usually sinuous, early ones very prominently so; surface often with finely agglutinated material; apertural end rarely extended to any considerable length; aperture usually narrow, with simple tooth.

Discussion. This species is rare, being represented by only a few specimens at station 107.

Quinqueloculina candeiana d'Orbigny, 1839

Quinqueloculina candeiana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 170, Pl. 12, Figs. 24-26.

Diagnosis. Test nearly twice as long as broad; chambers triangular in transverse section, angles subacute, last-formed chamber extended at apertural end forming prominent neck; sutures distinct; wall calcareous, smooth; aperture circular, comparatively small, at end of projecting neck, with simple tooth.

Discussion. This species is rare, occurring at only five stations in very low frequencies.

Quinqueloculina collumnosa Cushman, 1922 (Plate 5, Figs. 9-11)

Miliolina cuvieriana Heron-Allen and Earland (not d'Orbigny), 1915, Trans. Zool. Soc. London, v. 20, p. 571, Pl. 4, Figs. 33-36.

Quinqueloculina collumnosa Cushman, 1922, Publ. 311, Carnegie Inst. Wash., p. 65, Pl. 10, Fig. 10.

Diagnosis. Test slightly longer than broad; chambers somewhat indistinct, periphery angled, projecting, last-formed chamber extending beyond outline of test at both ends, somewhat undulate; wall smooth, dull; apertural end much contracted, extended to form narrow, cylindrical neck, with small rounded aperture with indistinct lip.

Discussion. This species is represented by a single specimen at station 96.

Quinqueloculina crassa var. subcuneata Cushman, 1921 (Plate 5, Figs. 12-14)

Miliolina crassa Heron-Allen and Earland (part) (not d'Orbigny), 1915, Trans. Zool. Soc. London, v. 20, p. 572, Pl. 42, Fig. 41.

Quinqueloculina crassa var. subcuneata Cushman, 1921, Bull. 100, U.S. Nat. Mus., v. 4, p. 423, Pl. 89, Fig. 4.

Diagnosis. Test somewhat longer than broad; chambers wedge-shaped, sharp at peripheral edges, covered with irregular costae, triangular in transverse section; sutures somewhat indistinct; wall calcareous, having rough appearance; aperture circular, with simple tooth.

Discussion. This species is represented by a single specimen at station 93.

Quinqueloculina dilatata d'Orbigny, 1839

Quinqueloculina dilatata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 192, Pl. 11, Figs. 28-30.

Diagnosis. Test broader than long; in adult last-formed chamber fails to make complete coil, chambers rounded; sutures indistinct; wall calcareous, glossy; aperture elongate, oval, offset to one side, with tooth some distance back from aperture.

Discussion. This species exhibits variability in its overall test shape, ranging from nearly round to broader than long. In most specimens it is impossible to see the tooth without sectioning. The quinqueloculine chamber pattern, in most cases, can be seen only on wetting the specimen or by sectioning.

Quinqueloculina dilatata is relatively rare in the area, occurring at only four stations

in very low frequencies.

Quinqueloculina horrida Cushman, 1947 (Plate 6, Figs. 1-3)

Quinqueloculina horrida Cushman, 1947, Contr. Cush. Lab. Foram. Res., v. 23, pt. 4, p. 88, Pl. 19, Fig. 1.

Diagnosis. Test nearly twice as long as broad; chambers rounded, last-formed chamber extended at apertural end into fairly long, cylindrical neck; sutures indistinct; wall coarsely arenaceous, principally of rather coarse sand grains from associated sediment, imbedded in calcareous cement; aperture round, at end of cylindrical neck, with slender, bifid tooth.

Discussion. The tooth structure and cylindrical neck are not preserved in any of the specimens observed, the neck always being partially broken. This species is rare, occurring as single specimens at only six stations.

Quinqueloculina laevigata d'Orbigny, 1826 (Plate 6, Figs. 4-6)

Quinqueloculina laevigata d'Orbigny, 1826, Ann. Soc. Nat., v. 7, p. 301, no. 6.

Diagnosis. Test elongate, much longer than broad, compressed laterally; chambers rounded, surface covered with longitudinal costae, which may not be immediately apparent; sutures distinct; wall calcareous; aperture round, usually at end of slight neck, with bifid tooth.

Discussion. The longitudinal costae which cover the surface of the chambers vary from being very faintly visible to strongly developed. When the costae are hard to distinguish Quinqueloculina laevigata has a strong resemblance to Quinqueloculina bosciana, but differs from it in possessing a bifid tooth. It also differs from Quinqueloculina poeyana in possessing a true bifid tooth, and in being more elongate.

This species is widespread, occurring at 60 stations usually in medium frequencies. It is another species that seems to be limited mainly to the shallow Florida Bay waters.

Quinqueloculina lamarckiana d'Orbigny, 1839 (Plate 6, Figs. 7-9)

Quinqueloculina lamarckiana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 189, Pl. 11, Figs. 14, 15.

Diagnosis. Test nearly as long as broad; chambers subacute, usually triangular in transverse section, angles of chambers almost resemble carinae, apertural end of last-formed chamber slightly extended; sutures distinct; wall calcareous, smooth, glossy; aperture round, with narrow, elongate tooth.

Discussion. This species exhibits considerable variability in the relative sizes of length to width, and in the acuteness of the chamber angles. It differs from Quinqueloculina candeiana in being almost as long as broad, in having more acute angles to the chambers and in having a much less pronounced neck, or no neck at all.

This is one of the more widespread species of the entire fauna, occurring at 86 stations in high enough frequencies to make it the sixth most abundant. It is conspicuously absent from the stations in the northern part of Florida Bay bordering the mainland of the Florida Peninsula. These stations are generally located in restricted small bays which are subject to large amounts of runoff during the rainy season, suggesting that Quinqueloculina lamarckiana cannot withstand the lowered salinities prevailing there at those times.

Quinqueloculina parkeri var. occidentalis Cushman, 1921 (Plate 6, Figs. 10-12)

Quinqueloculina parkeri (Brady), var. occidentalis Cushman, 1921, Proc. U.S. Nat. Mus., v. 59, p. 69.

Diagnosis. Test longer than broad; chambers rounded, irregular, covered with fine transverse or slightly oblique ridges or crenulations, last-formed chamber extended to form a neck; wall calcareous; aperture oval, with single tooth.

Discussion. This species is represented by single specimens at stations 4 and 90.

Quinqueloculina poeyana d'Orbigny, 1839 (Plate 6, Figs. 13-15)

Quinqueloculina poeyana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 191, Pl. 11, Figs. 25-27.

Diagnosis. Test longer than braod; chambers rounded; surface ornamented by numerous longitudinal costae running parallel to edges of chambers; sutures distinct; wall calcareous; aperture circular, with single, narrow tooth, sometimes slightly bifid at tip.

Discussion. This species varies in its relative size of length to width. Typically, specimens are much longer than broad, but others are wide enough to overlap morphologically with Quinqueloculina tenagos. The tooth structure is usually consistent, but a slight thickening and even a slightly bifid condition at the tip is present is some specimens.

Quinqueloculina poeyana differs from Quinqueloculina tenagos in having a greater length than width, from Quinqueloculina subpoeyana in having a shorter neck and regular costae, and from Quinqueloculina laevigata in being less elongate, less compressed and by not possessing a true bifid tooth. Morphologic overlap based on test shape appears to exist with Quinqueloculina tenagos and Quinqueloculina laevigata at the extreme range, and with Quinqueloculina poeyana in the median range. Overlap based on the character of the costae and the size of the neck appears to exist between Quinqueloculina poeyana and Quinqueloculina subpoeyana. Considering the generally wide morphologic variation exhibited by members of the Miliolidae, it is doubtful if all of the above are valid species.

Quinqueloculina poeyana is the third most abundant speices in the fauna and is quite widespread, occurring at 66 stations within the general confines of Florida Bay. It is most abundant at those stations with the finer-grained sediment, and it too is absent from those stations which experience the lowest salinities.

Quinqueloculina polygona d'Orbigny, 1839 (Plate 7, Figs. 1-3)

Quinqueloculina polygona d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 198, Pl. 12, Figs. 21-23.

Diagnosis. Test longer than broad; chamber angles acute, with projecting carina at either angle, polygonal in transverse section, last-formed chamber extended at apertural end into prominent neck; sutures distinct; wall calcareous, smooth; aperture circular, with single, undivided or bifid tooth.

Discussion. This species varies in tooth structure, relative size of length to width and in the size of the neck. Tooth structure ranges from single, non-bifid to true bifid teeth. Most specimens have tests which are elongate, much longer than broad, but some become less elongate, although never to the point where they are as broad as long. The size of the neck varies from specimens with long protruding necks to those with short slightly protruding necks.

This is one of the more abundant species of the fauna, occurring at 42 stations, usually in medium frequencies. It is another species which appears to be mainly restricted to the shallow waters of Florida Bay.

Quinqueloculina sabulosa Cushman, 1947 (Plate 7, Figs. 4-6)

Quinqueloculina sabulosa Cushman, 1947, Contr. Cush. Lab. Foram. Res., v. 23, pt. 4, p. 87, Pl. 18, Fig. 22.

Diagnosis. Test small, nearly twice as long as broad; chambers rounded; sutures indistinct; wall coarsely arenaceous, principally of sand grains from associated sediment, imbedded in calcareous cement, whole surface has rough appearance; aperture circular, at end of short neck, with short, broad tooth.

Discussion. This species somewhat resembles some specimens of Quinqueloculina agglutinans having single, non-bifid teeth, but it is very much smaller. It occurs at 38 stations in low

to medium frequencies. Its distribution appears to be controlled by the grain size of the sediment, occurring only at those stations with the finer-grained sediment.

Quinqueloculina seminulum (Linnaeus), 1767 (Plate 7, Figs. 7-9)

Serpula seminulum Linnaeus, 1767, Syst. Nat., ed. 12, p. 1264.

Quinqueloculina seminulum d'Orbigny, 1826, Ann. Sci. Nat., v. 7, p. 503.

Diagnosis. Test longer than broad; chambers inflated, distinct, uniform; wall calcareous, smooth, glossy, polished; aperture large, oval, with simple tooth.

Discussion. Many different specimens from many parts of the world have been placed in this controversial species by various authors. In this study only those specimens are included in this species which closely coincide with the described apertural characterisitics.

This species occurs at 50 stations in low to medium frequencies. It appears to be another typical, shallow-water bay species.

Quinqueloculina sp. (Plate 8, Figs. 3-5)

Only two specimens of this species were found at station 107. It is similar in general shape to Quinqueloculina polygona except that the chambers are rounded instead of polygonal.

Quinqueloculina subpoeyana Cushman, 1922 (Plate 7, Figs. 10-12)

Quinqueloculina subpoeyana Cushman, 1922, Publ. 311, Carnegie Inst. Wash., p. 66.

Diagnosis. Test much longer than broad; chambers rounded, surface ornamented by numerous, irregular costae running at angles to chamber edges, last-formed chamber extended at apertural end into protruding neck; sutures distinct; wall calcareous; aperture circular, at end of protruding neck, with simple tooth.

Discussion. This species varies in the size of the neck and in the angularity of the costae. Most specimens placed in this species have protruding necks, but the degree of protrusion ranges from very prominent to very slight. The angles at which the costae run to the chamber edges range from sub-parallel to very acute.

Quinqueloculina subpoeyana differs from Quinqueloculina poeyana only in having a more prominent neck and in having costae which are irregular and run at an angle to the chamber edges instead of parallel to them. It may be that Quinqueloculina subpoeyana is merely an extreme variant of Quinqueloculina poeyana.

This species occurs at 12 stations, usually in low frequencies.

Quinqueloculina tenagos Parker, 1962 (Plate 7, Figs. 13-15)

Quinqueloculina costata d'Orbigny, 1826, Ann. Sci. Nat., ser. 1, v. 7, p. 135.

Quinqueloculina rhodiensis Parker, new name, Parker, Phleger and Pierson, 1953, Cush. Found. Foram. Res., Spec. Publ. no. 2, p. 12, Pl. 2, Figs. 15-17.

Quinqueloculina tenagos Parker, 1962, Contr. Cush. Found. Foram. Res., v. 13, p. 110.

Diagnosis. Test nearly as broad as long, chambers rounded, surface ornamented by numerous, regular, longitudinal costae; sutures distinct; wall calcareous, aperture circular, with single, narrow tooth.

Discussion. The only character in which this species appears to differ from Quinqueloculina poeyana is in the relative size of length to breadth. Only species with tests nearly as broad as long are placed in the species Quinqueloculina tenagos.

This species occurs at eight stations in low to medium frequencies.

Quinqueloculina tricarinata d'Orbigny, 1839 (Plate 8, Figs. 1-2)

Quinqueloculina tricarinata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 187, Pl. 11, Figs. 7-9, 11.

Diagnosis. Test large, nearly twice as long as broad, divided into irregular areas by oblique transverse costae; last-formed chamber extends beyond test at either end; sutures indistinct; wall calcareous, irregular areas giving surface corrugated appearance; aperture circular, at end of narrow, cylindrical neck.

Discussion. This species occurs at seven stations in low to medium frequencies.

Quinqueloculina vulgaris d'Orbigny, 1826

Quinqueloculina vulgaris d'Orbigny, 1826, Ann. Sci. Nat., v. 7, p. 302, no. 33.

Diagnosis. Test short, stout, nearly as broad as long; orbicular in front view; chambers roughly triangular in transverse section, periphery bluntly angled, sides straight or slightly convex; sutures distinct; wall smooth; aperture elongate, narrow, with tooth slightly bifid at tip.

Discussion. This species is represented by two specimens at station 95 and by one at station 96.

Quinqueloculina wiesneri Parr, 1950

Quinqueloculina anguina Terquim var. wiesneri Parr, 1950, B.A.N.Z. Ant. Res. Exped., 1929-1931 Repts., ser. B, v. 5, pt. 6, p. 290, Pl. 6, Figs. 9, 10.

Diagnosis. Test twice as long as broad; chambers rounded, inflated; sutures distinct; wall calcareous, smooth, glossy; aperture opening at end of last-formed chamber, without neck.

Discussion. This species occurs at nine stations, usually in very low frequencies.

GENUS CRUCILOCULINA d'Orbigny, 1839

Cruciloculina triangularis d'Orbigny, 1839 (Plate 8, Figs. 6, 7)

Cruciloculina triangularis d'Orbigny, 1839, Voy. dans. l'Amer. Merid., Foraminiferes, p. 72.

Diagnosis. Test free, triloculine in chamber development, triangular in cross section, with sides equal in breadth, flat to very slightly convex, angles acute; chambers increasing regularly in size with final chamber only moderately overlapping earlier chambers; sutures distinct, very slightly incised; wall calcareous, imperforate, surface smooth; aperture typically cruciform, with extremities tending to become dendritic in larger specimens, bordered with narrow lip.

Discussion. This species is represented by a single specimen at station 103.

GENUS MASSILINA Schlumberger, 1893

Massilina protea Parker, 1953 (Plate 8, Figs. 8, 9)

Massilina protea Parker, 1953, Cush. Found. Foram. Res., Spec. Publ. No. 2, p. 10, Pl. 2, Figs. 1-4, text Fig. 2.

Diagnosis. Test somewhat longer than broad, compressed, with rounded periphery; chambers few in number, not always half coil in length, exposing three to four chambers per side; sutures depressed, often indistinct, especially in central portion; wall thick, variably costate, costae low, running parallel to periphery, but not necessarily continuously; aperture almost circular, with thick, polished lip, short bifid tooth which varies greatly in breadth.

Discussion. This species occurs at stations 16, 26 and 29 in very low frequencies.

Massilina secans d'Orbigny, 1826

Quinqueloculina secans d'Orbigny, 1826, Ann. Sci. Nat., v. 7, p. 303, no. 43, Modeles no. 96.

Miliolina secans Brady, 1884, Rep. Voy. Challenger, Zool., v. 9, p. 167, Pl. 6, Figs. 1, 2.

Massilina secans Schlumberger, 1893, Mem. Soc. Zool. France, v. 6, p. 218, Pl. 4, Figs. 82, 83.

Diagnosis. Test in early stages quinqueloculine, later with chambers added in one plane, rounded in side view, nearly as broad as long, narrow in end-view; periphery rounded; chambers distinct, usually four or five visible on each side; sutures distinct, depressed; wall smooth; aperture elongate.

Discussion. Some specimens of this species may slightly resemble the more compressed forms of Miliolinella circularis in side-view, but inspection of the number of chambers visible facilitates identification, and the apertures are completely different, elongate in Massilina secans and crescentiform with a broad tooth in Miliolinella circularis.

This species occurs at 14 stations in low to medium frequencies.

GENUS PYRGO Defrance, 1824

Pyrgo comata (Brady), 1884 (Plate 8, Fig. 10)

Biloculina comata Brady, 1884, Rep. Voy. Challenger, Zool., v. 9, p. 144, Pl. 3, Figs. 9a, b.

Pyrgo comata Cushman, 1929, Bull. 104, U.S. Nat. Mus., pt. 6, p. 73.

Diagnosis. Test subglobular, chambers very much inflated, subcircular in end-view; suture distinct, incised; wall ornamented with numerous, fine, longitudinal costae; aperture elongate, with tooth often with wing-like extensions at ends.

Discussion. This species occurs at only two stations. It is represented by a single specimen at station 4, but at station 1 it is quite common. A single occurrence could be explained by transport by storms, while the common occurrence at station 1, 587 m., suggests that this is a true depth-dependent species.

Pyrgo denticulata (Brady), 1884 (Plate 8, Fig. 11)

Biloculina ringens Lamarck, var. denticulata Brady, 1884, Rep. Voy. Challenger, Zool., v. 9, p. 143, Pl. 3, Figs. 4, 5.

Biloculina denticulata Cushman, 1917, Bull. 71, U.S. Nat. Mus., pt. 6, p. 80, Pl. 33, Fig. 1.

Pyrgo denticulata Cushman, 1929, Bull. 104, U.S. Nat. Mus., pt. 6, p. 80, Pl. 33, Fig. 1.

Diagnosis. Test elongate, roughly quadrangular in front-view, somewhat compressed in end-view, biconvex; apertural end broadly rounded,opposite end with series of short, irregular teeth; wall smooth, usually polished; aperture very broad, narrow, ends somewhat expanded, with long, narrow tooth, making inner border of aperture plate-like, somewhat raised above level of surface to which it is attached, as is whole border of aperture.

Discussion. This species occurs at eight stations in low frequencies. It appears to be limited to the waters adjacent to the lower keys.

Pyrgo elongata (d'Orbigny), 1826 (Plate 8, Fig. 12)

Biloculina elongata d'Orbigny, 1826, Ann. Sci. Nat., v. 7, p. 298, No. 4.

Pyrgo elongata Cushman, 1929, Bull. 104, U.S. Nat. Mus., pt. 6, p. 70, Pl. 19, Figs. 2, 3.

Diagnosis. Test elongate, somewhat pyriform, tapering gradually toward apertural end, rounded at opposite end, subelliptical in end-view, periphery rounded; suture distinct, depressed; wall smooth; aperture generally broadly elliptical with small flattened tooth partially filling opening.

Discussion. This species occurs only at station 4 in low frequency.

Pyrgo fornasinii Chapman and Parr, 1935 (Plate 8, Fig. 13)

Biloculina ringens Brady, 1884, Rep. Voy. Challenger, Zool., v. 9, p. 142, Pl. 2, Fig. 7.

Biloculina bradyi Schlumberger (not Fornasini), 1891, Mem. Soc. Zool. France, v. 4, p. 170, Pl. 10, Figs. 63-71.

Pyrgo fornasinii Chapman and Parr, 1935, Journ. Roy. Soc. W. Australia, v. 21, p. 5.

Diagnosis. Test in front-view nearly circular, ends slightly truncate, in end-view ellipsoidal, periphery angled, somewhat produced, margin subcarinate; wall smooth; aperture very broad in end-view, with tooth curved, concave in middle, ends extended, aperture curving in circle about them.

Discussion. This species is represented by single specimens at stations 1 and 4.

Pyrgo murrhina (Schwager), 1866 (Plate 8, Fig. 14)

Biloculina murrhina Schwager, 1866, Novara Exped., Geol., v. 2, p. 203, Pl. 4, Figs. 15a-c.

Biloculina depressa d'Orbigny, var. murrhyna Brady, 1884, Rep. Voy. Challenger, Zool., v. 9, p. 146, Pl. 2, Figs. 10, 11.

Pyrgo murrhina (Schwager) Cushman, 1929, Bull. 104, U.S. Nat. Mus., pt. 6, p. 71, Pl. 19, Figs. 6, 7.

Diagnosis. Test in front-view in young specimens nearly circular, in adult somewhat longer than broad, in end-view ellipsoidal, with borders extended, carinate, carinae interrupted at point opposite aperture leaving sinus, deep, often with long spine at each angle in young specimens; in adults sinus less deep, spines usually reduced or wanting; wall smooth; aperture in young with neck not exceeding periphery of test, in adults with prominently exserted tubular neck with bifid tooth partially filling circular opening.

Discussion. This species occurs at six stations in very low frequencies. It is absent from Florida Bay, being found in the somewhat deeper waters between the keys and the reef, and in the adjacent Gulf of Mexico.

Pyrgo subsphaerica (d'Orbigny), 1839 (Plate 8, Fig. 15)

Biloculina subsphaerica d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 162, Pl. 18, Figs. 25-27.

Pyrgo subsphaerica Cushman, 1929, Bull. 104, U.S. Nat. Mus., pt. 6, p. 68, Pl. 18, Figs. 1, 2.

Diagnosis. Test small, rotund, slightly longer than broad, somewhat broader than thick; chambers rounded, inflated; sutures distinct, depressed, in side view sinuous line concave toward preceding chamber at opposite end; wall smooth, polished; aperture broadly oval with somewhat flattened tooth, with short lateral extensions at tip only partially filling aperture.

Discussion. Young specimens of Pyrgo subsphaerica are triloculine in chamber arrangement with three chambers always visible on the exterior. Overall test shape must be used for identification to prevent placing young specimens in the genus Triloculina.

This species occurs at 41 stations in low to medium frequencies. It is generally restricted to the shallow waters of Florida Bay.

GENUS SIGMOILINA Schlumberger, 1887

Sigmoilina distorta Phleger and Parker, 1951

Sigmoilina distorta Phleger and Parker, 1951, Mem. Geol. Soc. America, v. 46, pt. 2, p. 8, Pl. 4, Figs. 3-5.

Diagnosis. Test small, compressed, nearly twice as long as broad, sigmoid character; wall smooth, with finely pitted surface; aperture round, on more or less well developed neck.

Discussion. This species has common occurrences at stations 35 and 37.

Sigmoilina schlumbergeri Silvestri, 1904 (Plate 9, Figs. 1-2)

Sigmoilina schlumbergeri Silvestri, 1904, Mem. Pont. Accad, Nuovi, Lincei, v. 22, p. 267.

Diagnosis. Test longer than broad, with distinct sigmoid character; sutures distinct, sometimes not visible; wall agglutinated, principally of sand grains from associated sediment, whole surface has rough appearance; aperture round, on short neck.

Discussion. This species occurs at stations 31, 93 and 96 in very low frequencies.

GENUS TRILOCULINA d'Orbigny, 1826

Triloculina bassensis Parr, 1945 (Plate 9, Figs. 2-8)

Triloculina bassensis Parr, 1945, Roy. Soc. Victoria, Proc., Melbourn, v. 56, pt. 2, p. 198.

Diagnosis. Test longer than broad; chambers angular, typically quadrate, surface may be covered with short, delicate ridges which give matte effect, apertural end of last-formed chamber extended into neck; sutures distinct; wall porcelaneous; aperture subquadrate, with long tooth, which may or may not be bifid.

Discussion. This species varies in tooth structure, specimens occur with non-bifid teeth which nearly fill the aperture while others with bifid teeth, as well as some with non-bifid teeth, only partially fill the aperture. The aperture itself varies from subquadrate to elongate and compressed.

This species occurs at 44 stations in low to medium frequencies. It appears to be another species restricted to Florida Bay, and does not occur at those stations with the lowest salinities.

Triloculina bermudezi Acosta, 1940 (Plate 9, Figs. 9-11)

Triloculina bermudezi Acosta, 1940, Soc. Cubana Hist. Nat. Mem., v. 14, p. 37, Pl. 4, Figs. 1-5.

Diagnosis. Test elongate oval; chambers rounded, inflated, tapering slightly towards apertural end; sutures distinct; wall calcareous, smooth, translucent; aperture very narrow, laterally compressed slit, almost completely filled with narrow, elongate tooth.

Discussion. This species is the fifth most abundant in the fauna. It occurs at 54 stations, usually in medium frequencies. It is another species that appears to be restricted to the shallow bay waters, and is also absent from those stations which have greatly reduced salinities during the rainy season. It is most abundant at stations with the finer-grained sediment, again suggesting sorting by current and wave action.

Triloculina bicarinata d'Orbigny, 1839 (Plate 9, Figs. 12-13); (Plate 10, Fig. 1)

Triloculina bicarinata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 158, Pl. 10, Figs. 18-20.

Diagnosis. Test longer than broad; typically with chambers with truncate periphery with double keels, angles somewhat extended; sutures distinct, somewhat depressed; surface ornamented by rectangular reticulations both on sides and outer angles; aperture elongate with definite thin lip, slightly everted, with elongate, narrow tooth extending above outline of aperture, may or may not be bifid.

Discussion. This species differs from Triloculina carinata in having a truncate periphery with double keels instead of a carinate periphery and in having rectangular rather than rounded or elliptical reticulations. It is a rare species, occurring at only eleven stations, usually being represented by single specimens.

Triloculina carinata d'Orbigny, 1839 (Plate 10, Figs. 2-4)

Triloculina carinata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba. "Foraminiferes", p. 179, Pl. 10, Figs. 15-17.

Diagnosis. Test longer than broad; typically with periphery of three chambers carinate, surface ornamented with small, rounded pits in regular series covering entire surface, except around aperture; sutures distinct, somewhat depressed; aperture elongate, narrow, with distinct everted lip, tooth very long, narrow, may or may not be bifid, projecting somewhat above apertural opening.

Discussion. Triloculina carinata is closely related to Triloculina bicarinata, the only difference being that it has a carinate instead of truncate periphery, and has regular rounded pits instead of rectangular reticulations. It is not an abundant species, exhibiting rare to common occurrences at 19 stations. There seems to be no definite pattern to its distribution.

Triloculina fitterei var. meningoi Acosta, 1940 (Plate 10, Figs. 5-7)

Triloculina fitterei Acosta var. meningoi Acosta, 1940, Torreia, Habana, Cuba, no. 3, p. 25-26, Pl. 4, Figs. 1-5.

Diagnosis. Test elongate; chambers twisted, rounded, tapering toward apertural end; sutures distinct; wall calcareous, surface ornamented with strong longitudinal costae; aperture elongate oval, without dentition.

Discussion. This species occurs at 38 stations, usually in low frequencies. It appears to be restricted to the shallow depths of Florida Bay proper and is not found in the more restricted parts of the bay immediately adjacent to the Florida mainland.

Triloculina gracilis d'Orbigny, 1839

Triloculina gracilis d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 159, Pl. 11, Figs. 10-12.

Diagnosis. Test elongate, slender, small; last-formed chamber extended at apertural end into cylindrical neck, outer end enlarged, with phialine lip, sutures very slightly depressed; surface smooth or very finely striate; aperture circular, with slight tooth.

Discussion. This species is represented by only a single specimen at station 18.

Triloculina linneiana d'Orbigny, 1839 (Plate 10, Figs. 8-10)

Triloculina linneiana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 172, Pl. 9, Figs. 11-13.

Diagnosis. Test elongate, typically with three visible chambers in adult, periphery rounded, large, tapering towards either end; sutures somewhat depressed; surface ornamented by few very prominent raised ridges, with deep concave depressions between; aperture rounded, with large bifid tooth projecting beyond outline of test.

Discussion. Triloculina linneiana shows little variation other than size. It resembles

Triloculina planciana, but is much larger and has very prominent ridges in contrast to the fine-lined ornamentation of the latter.

This species is apparently randomly distributed and fairly widespread with rare to common occurrences at 42 stations.

Triloculina linneiana var. comis Bandy, 1956 (Plate 10, Figs. 11-12; Plate 11, Fig. 1)

Triloculina linneiana d'Orbigny var. comis Bandy, 1956, Geol. Surv. Prof. Paper 274G, p. 198, Pl. 29, Fig. 12.

Discussion. This variety differs from the typical form in possessing numerous longitudinal costae, in having the apertural end extended into a cylindrical neck and in having a round aperture with a very small bifid tooth.

This species is present at only five stations at very low frequencies.

Triloculina oblonga (Montague), 1803 (Plate 11, Figs. 2-4)

Vermiculum oblongum Montague, 1803, Test. Brit., p. 522, Pl. 14, Fig. 9.

Triloculina oblonga d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 300, no. 16.

Diagnosis. Test elongate, adult with three chambers visible, last-formed chamber broadest near initial end, longer than preceding ones; triangular in end-view, sides broadly curved, angles rounded, chambers inflated; sutures distinct, depressed; wall smooth, polished; aperture oval, with short tooth.

Discussion. This species occurs at 19 stations at low to medium frequencies. Its distribution seems to be limited to the stations with finer-grained sediments.

Triloculina planciana d'Orbigny, 1839 (Plate 11, Figs. 5-7)

Triloculina planciana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 173, Pl. 9, Figs. 17-19.

Diagnosis. Test elongate; chambers distinct; sutures slightly, if at all, depressed; periphery broadly rounded; wall ornamented by numerous short, incised lines, surface polished; aperture rounded, with bifid tooth projecting slightly above apertural opening.

Discussion. This species somewhat resembles Triloculina linneiana, but differs from it in being smaller and in having fine lines for ornamentation as opposed to the prominent ridges of the latter.

Triloculina planciana is fairly widespread, occurring at 55 stations in low to moderate frequencies. It is absent from the more restricted areas of Florida Bay adjacent to the mainland, and also from those stations with the coarsest sediment. It has its greatest concentrations around the Key West area.

Triloculina rotunda d'Orbigny, 1826 (Plate 11, Figs. 8-10)

Triloculina rotunda d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 299, no. 4.

Diagnosis. Test somewhat longer than broad; chambers rotund, periphery broadly rounded; surface of test made up largely of two last-formed chambers; sutures very slightly depressed; apertural end somewhat contracted, with slightly thickened lip; wall smooth, glossy, often with transverse wrinkles; aperture rounded, with bifid tooth projecting somewhat above outline of aperture.

Discussion. This species occurs at 21 stations, usually in low frequencies. Its distribution seems to be limited to those stations with the coarsest sediment.

Triloculina sidebottomi (Martinotti), 1920 (Plate 11, Figs. 11-13)

Miliolina subrotunda Sidebottom (not Vermiculum subrotundum Montague), 1904, Manchester Lit. Phil. Soc., vol. 68, no. 5, p. 8, Pl. 3, Figs. 1-7.

Sigmoilina sidebottomi Martinotti, 1920, Att., Soc. Ital. Sci. Nat., vol. 59, Pl. 2, Fig. 29.

Triloculina sidebottomi Parker, Phleger and Pierson, 1953, Cush. Lab. Foram. Res., Spec. Publ. no. 2, p. 14, Pl. 2, Figs. 25-28.

Diagnosis. Test much broader than long, large; chambers inflated, with rounded periphery, surface of test largely composed of two last-formed chambers; sutures distinct; wall smooth, glossy; aperture round, with crescentiform tooth seeming to extend into aperture from lip.

Discussion. This is a rare species, occurring at only five stations in low frequencies.

Triloculina squamosa Terquem, 1878

Triloculina squamosa Terquem, 1878, Soc. Geol. France, Mem., ser. 3, tome 1, no. 3, p. 59, Pl. 5, Fig. 26.

Diagnosis. Test longer than broad; chambers rounded, inflated, triangular in transverse section; sutures indistinct; wall arenaceous, principally of sand grains from associated sediment, entire surface with rough appearance; aperture oval, with narrow, slender tooth, thickened at end.

Discussion. This is a rare species, occurring at only six stations as single specimens.

Triloculina tricarinata d'Orbigny, 1826 (Plate 12, Figs. 1, 2)

Triloculina tricarinata d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 299, no. 7.

Diagnosis. Test somewhat longer than broad, triangular in end-view, three chambers visible, angles of chambers sharply angled, often almost carinate, sides straight; sutures distinct; wall smooth, polished; aperture rounded, with narrow, bifid tooth.

Discussion. Triloculina tricarinata varies in degree of length to width proportions and in the sharpness of the chamber angles. Some specimens are nearly as wide as long, while others are much longer than wide. The sharpness of the chamber angles varies from sharply acute (some actually carinate), to subacute, to specimens with the margins of the chambers becoming somewhat rounded.

This species occurs at 38 stations, usually in low frequencies. It is another species absent from the more restricted areas of the bay, and it does not occur at the deeper stations.

Triloculina trigonula (Lamarck), 1804 (Plate 12, Figs. 3, 4)

Miliola trigonula Lamarck, 1804, Ann. Mus., vol. 5, p. 351, no. 3.

Miliolites trigonula Lamarck, 1807, Ann. Nat. Hist. Paris Mus., vol. 9, Pl. 17, Fig. 4.

Triloculina trigonula d'Orbigny, 1858, Ann. Sci. Nat., vol. 7, p. 299, no. 1, Pl. 16, Figs. 5-9.

Diagnosis. Test somewhat longer than broad, periphery broadly convex, triangular in end-view; three chambers visible, angles rounded, sides convex; sutures distinct; wall smooth, polished; aperture round, with bifid tooth.

Discussion. Triloculina trigonula exhibits a wide range of variation in chamber form. Some specimens have chambers with subacute angles, while others have broadly rounded chambers. One specimen was found with a hood growing over the aperture.

This is a widespread species, occurring at 75 stations, usually in medium frequencies. It

is absent only from the deeper stations and from the more restricted areas of the bay.

SUBFAMILY MILIOLINELLINAE Vella, 1957

GENUS MILIOLINELLA Wiesner, 1931

Miliolinella circularis (Bornemann), 1855 (Plate 12, Fig. 5)

Triloculina circularis Bornemann, 1855, Geol. Ges. Zeitschr., vol. 7, pt. 2, p. 349, Pl. 19, Figs. 4a-c.

Miliolina circularis Brady, 1884, Rep. Voy. Challenger, Zool., vol. 9, p. 169, Pl. 4, Fig. 3, Pl. 5, Figs. 13-14.

Miliolinella circularis Asano, 1951, Ill. Cat. Jap. Tert. Smaller Foram., pt. 6, p. 9, Figs. 65-67.

Diagnosis. Test rounded, compressed, periphery rounded; three chambers making up visible portion of test rounded, inflated; last-formed chamber strongly embracing; sutures distinct, depressed; wall calcareous, smooth, polished; aperture narrow, crescentiform slit, with large, flattened, semicircular tooth, which in side-view appears to be in front of aperture.

Discussion. This species occurs at 53 stations, usually in medium frequencies, but occasionally in very high frequencies. It is absent from those stations immediately adjacent to the Florida mainland and from the stations with the deeper waters. It appears to be a truely diagnostic species for shallow, warm-water, calcareous areas.

Miliolinella fichteliana (d'Orbigny), 1839 (Plate 12, Fig. 6)

Triloculina fichteliana d'Orbigny, 1839, in De la sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 171, Pl. 9, Figs. 8-10.

Diagnosis. Test subcircular in front-view, somewhat compressed; periphery rounded; chambers distinct; sutures slightly depressed; wall calcareous, ornamented by numerous longitudinal costae; aperture semicircular, with slight tooth somewhat in front of aperture.

Discussion. This species occurs at 17 stations in low to medium frequencies. Its distribution seems to be entirely random.

Miliolinella labiosa (d'Orbigny), 1839 (Plate 12, Fig. 7)

Triloculina labiosa d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminiferes", p. 178, Pl. 10, Figs. 12-14.

Miliolina labiosa Brady, 1884, Rep. Voy. Challenger, Zool., vol. 9, p. 170, Pl. 6, Figs. 3-5.

Miliolinella labiosa Said, 1950, Contr. Cush. Found. Foram. Res., vol. 1, pts. 1 and 2, p. 5, Pl. 1, Fig. 10.

Diagnosis. Test much broader than long; surface largely composed of two last-formed chambers; chambers often somewhat irregular; periphery rounded; surface smooth, dull; aperture crescentiform, with triangular tooth placed somewhat in front of aperture.

Discussion. Miliolinella labiosa exhibits variation in overall test shape. Although always broader than long, the relative dimensions differ to some degree. Some specimens have a much greater breadth than length, but others exist in which these dimensions are almost equal. Those with nearly equal dimensions may represent young forms, and those which are broader than long may represent the adult stage, for there is a noticeable difference in the dimensions with corresponding difference in size. The two last-formed chambers are very irregular, in some specimens they are in an even plane, while in others they are at an angle to each other.

This species occurs at 37 stations, usually in low to medium frequencies. Its distribution seems to be random, but it is not found in the deeper water.

Miliolinella obliquinoda (Riccio), 1950

Triloculinella obliquinodus Riccio, 1950, Contr. Cush. Lab. Foram. Res., vol. 1, pts. 3, 4, p. 90, Pl. 15, Figs. 1, 7.

Diagnosis. Test elongate, ovate, slightly compressed; three chambers visible, inflated, last-formed chamber broadest at initial end, longer than preceding ones; peripheral edge broadly rounded in end-view; sutures distinct, arcuate, somewhat depressed; wall smooth; aperture oblique, with large, semicircular flap covering most of it.

Discussion. This species occurs at only one station in a low frequency.

Miliolinella suborbicularis (d'Orbigny), 1826 (Plate 12, Fig. 8)

Triloculina suborbicularis d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 300, no. 12.

Miliolina suborbicularis Sidebottomi, 1904, Mem. Proc. Manchester Lit. Philos. Soc., vol. 48, no. 5, p. 9.

Diagnosis. Test compressed laterally, often broader than long, peripheral margin rounded; sutures distinct, depressed; wall longitudinally costate, earliest chambers sometimes nearly smooth, sometimes only peripheral margins costate; aperture subcircular with flattened lip, tooth simple, semicircular, at some distance in front of aperture.

Discussion. This species occurs at nine stations, always in very low frequencies.

SUBFAMILY MILIOLINAE Ehrenberg, 1839

GENUS HAUERINA d'Orbigny, 1839

Hauerina bradyi Cushman, 1917 (Plate 12, Fig. 9)

Hauerina bradyi Cushman, 1917, U.S. Nat. Mus., Bull. 71, pt. 6, p. 62, Pl. 23, Fig. 2.

Diagnosis. Test much compressed, earliest coils milioline, later becoming spiroloculine, more than two chambers appear in last-formed coil, three usually making up whole coil; wall very finely striate-reticulate; periphery rounded or subcarinate; aperture seive-plate entire height of chamber, curved, with numerous pores.

Discussion. This species occurs at 19 sations, usually in very low frequencies. There seems to be no distinct pattern to its distribution.

Hauerina speciosa (Karrer), 1868 (Plate 12, Figs. 10, 11)

Spiroloculina speciosa Karrer, 1868, Akad. Wiss. Wien, vol. 58, p. 135, Pl. 1, Fig. 8.

Hauerina speciosa, (Said), 1949, Spec. Publ. 26, Cush. Lab. Foram. Res., p. 17, Pl. 2, Fig. 10.

Diagnosis. Test very small, strongly compressed, 8-15 visible chambers, rounded, often tapering at both ends; each chamber plicated, with plications of last-formed chambers somewhat raised above surface of test; wall of last-formed chambers somewhat corrugated; aperture elongate, sinuous on both sides, with long tooth.

Discussion. A single specimen of this species occurs at station 100.

GENUS SCHLUMBERGERINA Munier-Chalmas, 1882

Schlumbergerina alveoliniformis var. occidentalis, Cushman, 1929 (Plate 12, Fig. 12)

Miliolina alveoliniformis Brady, 1879, Quart. Journ. Micro. Sci., vol. 19, p. 268.

Quinqueloculina alveoliniformis Cushman, 1917, Bull. 71, U.S. Nat. Mus., pt. 6, p. 43.

Schlumbergerina aleveoliniformis (Brady), var. occidentalis Cushman, 1929, U.S. Nat. Mus., Bull. 104, pt. 6, p. 36, Pl. 7, Fig. 2.

Diagnosis. Test elongate, fusiform, composed of numerous chambers, long, fairly narrow, five normally visible from exterior; wall in young thin, porcelanous, in adults covered with sand grains from associated sediment; aperture composed of numerous pores, or radiate, typically cribrate.

Discussion. This species occurs at stations 2, 3, and 4, which are back reef areas.

SUBFAMILY TUBINELLINAE Rhumbler, 1906

GENUS ARTICULINA d'Orbigny, 1826

Articulina antillarum Cushman, 1922 (Plate 12, Fig. 13)

Articulina antillarum Cushman, 1922, Publ. 311, Carnegie Inst. Wash., p. 71, Pl. 12, Fig. 5.

Diagnosis. Test elongate, early portion in microspheric form milioline, in megalospheric form Cyclogyra-like, remainder, larger portion of test made up of linear series of elongate chambers, gradually increasing in size towards apertural end; chambers truncate at distil end, then somewhat circular, without lip; surface of chambers with several rounded, longitudinal costae; aperture terminal, with everted lip.

Discussion. This species is represented by only a single specimen at station 107.

Articulina lineata Brady, 1884 (Plate 13, Fig. 1)

Articulina lineata Brady, 1884, Rep. Voy. Challenger, Zool., vol. 9, p. 183, Pl. 12, Figs. 19-21.

Diagnosis. Test elongate, compressed, early portion triloculine, becoming uniserial in later portion; usually one or two uniserial chambers, rarely three; wall ornamented by numerous longitudinal costae; aperture terminal, very elongate, narrow, with distinctive thickened lip, curved back at ends, extending slightly beyond width of chamber.

Discussion. All the specimens of Articulina lineata examined during this investigation have two uniserial chambers, It is similar to Articulina sagra, but differs from it in having a greater width to the uniserial chambers relative to test length, and in having the aperture only very slightly extending beyond the width of the test, thus constricting the base of the next chamber, which is in contrast to the everted lip of A. sagra extending well beyond the width of the underlying chamber forming a broadened base for the next chamber.

Articulina lineata occurred at only five stations in low frequenices.

Articulina mayori Cushman, 1922 (Plate 13, Fig. 2)

Articulina mayori Cushman, 1922, Publ. 311, Carnegie Inst. Wash., p. 71, Pl. 13, Fig. 5.

Diagnosis. Test very elongate, slender, slightly curved, circular in transverse section; early portion triserial, later portion uniserial with one to four uniserial chambers, even in size; wall with few, slightly raised, longitudinal costae; aperture terminal, nearly circular, with thickened lip extending slightly beyond chamber wall.

Discussion. This species is represented by single specimens at stations 77, 92 and 95.

Articulina mexicana Cushman, 1921 (Plate 13, Fig. 3)

Vertebralina sp. Cushman, 1921, Proc. U.S. Nat. Mus., vol. 59, p. 64.

Articulina mexicana Cushman, 1922, Publ. 311, Carnegie Inst. Wash., p. 70, Pl. 11, Figs. 7, 8.